Examiner: David SAMPLE
Art Unit: 2871
Facsimile: 703-872-9310

Docket No.: NHL-SCT-19 US
Serial No.: 09/758,952
Telephone: 703-308-3825

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In the Claims:

Please cancel claims 1-13, without prejudice.

Please add the following newly-presented claims:

--14. A flat panel liquid-crystal display, such as for a laptop computer, the flat panel liquid-crystal display comprising one of: a twisted nematic display, a supertwisted nematic display, an active matrix liquid-crystal display, a thin film transistor display, and a plasma addressed liquid-crystal display, said flat panel liquid-crystal display comprising:

backlight apparatus;

a first linear polarizer adjacent said backlight apparatus;

a first positive uniaxial retardation film adjacent said first linear polarizer;

a first negative retardation film adjacent said first positive uniaxial retardation film;

a first orientation film adjacent said first negative retardation film;

a liquid-crystal layer adjacent said first orientation film;

a second orientation film adjacent said liquid-crystal layer;

a second negative retardation film adjacent said second orientation film;

a second positive uniaxial retardation film adjacent said

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second negative retardation film;

a second linear polarizer adjacent said second positive uniaxial retardation film;

a first glass substrate being disposed between said first orientation film and said first negative retardation film;

a second glass substrate being disposed between said second orientation film and said second negative retardation film;

a first electrode being disposed between said first glass substrate and said first orientation film; and

a second electrode being disposed between said second glass substrate and said second orientation film;

said first and said second glass substrates comprising:

an alkali-free aluminoborosilicate glass;

said glass having a coefficient of thermal expansion $\alpha_{20/300}$ of between 2.8 x 10^{-6}/K and 3.8 x 10^{-6}/K;

said glass having the composition (in % by weight, based on oxide):

SiO_2	> 58 - 64.5
B_2O_3	> 6 - 10.5
Al_2O_3	20.5 - 24
MgO	0 - < 3
CaO	2.5 - < 8
SrO	0.1 - 3.5

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BaO	> 5 - 7.5
with SrO + BaO	≤ 8.6
with MgO + CaO + SrO + BaO	8 - 18
ZnO	0 - < 2;

said glass being configured to be resistant to thermal shock;

said glass being configured to having a high transparency over a broad spectral range in the visible and ultra violet ranges; and

said glass being configured to be free of bubbles, knots, inclusions, streaks, and surface undulations.--

--15. The flat panel liquid-crystal display according to claim 14, wherein:

said glass comprises at least one of (a.), (b.), (c.), (d.), (e.), (f.), and (g.), where (a.), (b.), (c.), (d.), (e.), (f.), and (g.) are:

(a.) more than 8% by weight of B_2O_3;

(b.) one of: at least 18% by weight of Al_2O_3, more than 18% by weight of Al_2O_3, at least 20.5% by weight of Al_2O_3, and at least 21.5% by weight of Al_2O_3;

(c.) at least 0.1% by weight of ZnO;

(d.) additionally (in % by weight):

ZrO_2	0 - 2

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TiO_2	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5
Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	≤ 1.5;

(e.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(f.) a float glass; and

(g.) one of (i.), (ii.), and (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from $2.8 \times 10^{-6}/K$ to $3.6 \times 10^{-6}/K$;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

--16. The flat panel liquid-crystal display according to claim 14, wherein:

said glass comprises (a.), (b.), (c.), (d.), (e.), (f.), and (g.), where (a.), (b.), (c.), (d.), (e.), (f.), and (g.) are:

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(a.) more than 8% by weight of B_2O_3;

(b.) one of: at least 18% by weight of Al_2O_3, more than 18% by weight of Al_2O_3, at least 20.5% by weight of Al_2O_3, and at least 21.5% by weight of Al_2O_3;

(c.) at least 0.1% by weight of ZnO;

(d.) additionally (in % by weight):

ZrO_2	0 - 2
TiO_2	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5
Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	$\leq$ 1.5;

(e.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(f.) a float glass; and

(g.) one of (i.), (ii.), and (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from

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2.8 x 10^{-6}/K to 3.6 x 10^{-6}/K;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

--17. A glass substrate for a flat panel liquid-crystal display, such as for a laptop computer, the flat panel liquid-crystal display including a twisted nematic display, a supertwisted nematic display, an active matrix liquid-crystal display, a thin film transistor display, and a plasma addressed liquid-crystal display, said substrate comprising:

an alkali-free aluminoborosilicate glass;

said glass having a coefficient of thermal expansion $\alpha_{20/300}$ of between 2.8 x 10^{-6}/K and 3.8 x 10^{-6}/K;

said glass having the composition (in % by weight, based on oxide):

SiO_2	> 58 - 64.5
B_2O_3	> 6 - 10.5
Al_2O_3	> 18 - 24
MgO	0 - < 3
CaO	1 - < 8
SrO	0.1 - 1.5
BaO	> 5 - 8
with SrO + BaO	< 8.5
with MgO + CaO + SrO + BaO	8 - 18

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ZnO	0 - < 2;

said glass being configured to be resistant to thermal shock;

said glass being configured to have a high transparency over a broad spectral range in the visible and ultra violet ranges; and

said glass being configured to be free of bubbles, knots, inclusions, streaks, and surface undulations.--

--18. The glass substrate according to claim 17, wherein:

said glass comprises at least one of (a.), (b.), (c.), (d.), (e.), (f.), and (g.), where (a.), (b.), (c.), (d.), (e.), (f.), and (g.) are:

(a.) more than 8% by weight of B_2O_3;

(b.) one of: at least 18% by weight of Al_2O_3, more than 18% by weight of Al_2O_3, at least 20.5% by weight of Al_2O_3, and at least 21.5% by weight of Al_2O_3;

(c.) at least 0.1% by weight of ZnO;

(d.) additionally (in % by weight):

ZrO_2	0 - 2
TiO_2	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5

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Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	$\leq$ 1.5;

(e.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(f.) a float glass; and

(g.) one of (i.), (ii.), and (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from $2.8 \times 10^{-6}/K$ to $3.6 \times 10^{-6}/K$;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

--19. The glass substrate according to claim 17, wherein:

said glass comprises (a.), (b.), (c.), (d.), (e.), (f.), and (g.), where (a.), (b.), (c.), (d.), (e.), (f.), and (g.) are:

(a.) more than 8% by weight of B_2O_3;

(b.) one of: at least 18% by weight of Al_2O_3, more than 18% by weight of Al_2O_3, at least 20.5% by weight of Al_2O_3, and at

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least 21.5% by weight of Al_2O_3;

(c.) at least 0.1% by weight of ZnO;

(d.) additionally (in % by weight):

ZrO_2	0 - 2
TiO_2	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5
Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	$\leq$ 1.5;

(e.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(f.) a float glass; and

(g.) one of (i.), (ii.), and (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from $2.8 \times 10^{-6}/K$ to $3.6 \times 10^{-6}/K$;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

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--~~20~~. A glass comprising:

a substantially alkali-free aluminoborosilicate glass;

said glass having a coefficient of thermal expansion $\alpha_{20/300}$ of between 2.8 x 10^{-6}/K and 3.8 x 10^{-6}/K;

said glass having the composition (in % by weight, based on oxide):

SiO_2	> 58 - 65
B_2O_3	> 6 - 10.5
Al_2O_3	> 14 - 25
MgO	0 - < 3
CaO	0 - 9
SrO	0.1 - 1.5
BaO	> 5 - 8.5
with SrO + BaO	≤ 8.6
with MgO + CaO + SrO + BaO	8 - 18
ZnO	0 - < 2.--

--21. The glass according to claim 20, wherein:

said glass is configured to be resistant to thermal shock;

said glass is configured to have a high transparency over a broad spectral range in the visible and ultra violet ranges; and

said glass is configured to be free of bubbles, knots, inclusions, streaks, and surface undulations.--

--22. The glass according to claim 21, wherein:

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said glass comprises more than 8% by weight of B_2O_3.--

--23. The glass according to claim 22, wherein:

said glass comprises one of (i.), (ii.), (iii.), and (iv.):

(i.) at least 18% by weight of Al_2O_3;

(ii.) more than 18% by weight of Al_2O_3;

(iii.) at least 20.5% by weight of Al_2O_3; and

(iv.) at least 21.5% by weight of Al_2O_3.--

--24. The glass according to claim 23, wherein:

said glass comprises at least 0.1% by weight of ZnO.--

--25. The glass according to claim 24, wherein:

said glass additionally comprises (in % by weight):

ZrO_2	0 - 2
TiO_2	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5
Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5; and
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	$\leq$ 1.5.--

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--26. The glass according to claim 25, wherein:

said glass comprises a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized.--

--27. The glass according to claim 26, wherein:

said glass comprises a float glass.--

--28. The glass according to claim 27, wherein:

said glass has one of (i.), (ii.), (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from 2.8 x 10^{-6}/K to 3.6 x 10^{-6}/K;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

--29. The glass according to claim 21, wherein:

said glass comprises at least one of (a.), (b.), (c.), (d.), (e.), (f.), and (g.), where (a.), (b.), (c.), (d.), (e.), (f.), and (g.) are:

(a.) more than 8% by weight of B_2O_3;

(b.) one of: at least 18% by weight of Al_2O_3, more than 18% by weight of Al_2O_3, at least 20.5% by weight of Al_2O_3, and at least 21.5% by weight of Al_2O_3;

(c.) at least 0.1% by weight of ZnO;

(d.) additionally (in % by weight):

ZrO_2	0 - 2
TiO_2	0 - 2

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with $ZrO_2 + TiO_2$	0 - 2
As_2O_3	0 - 1.5
Sb_2O_3	0 - 1.5
SnO_2	0 - 1.5
CeO_2	0 - 1.5
Cl^-	0 - 1.5
F^-	0 - 1.5
SO_4^{2-}	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	$\leq$ 1.5;

(e.) a glass in which arsenic oxide, antimony oxide, and inherent impurities are minimized;

(f.) a float glass; and

(g.) one of (i.), (ii.), and (iii.):

(i.) a coefficient of thermal expansion $\alpha_{20/300}$ of from $2.8 \times 10^{-6}/K$ to $3.6 \times 10^{-6}/K$;

(ii.) a glass transition temperature T_g of > 700°C; and

(iii.) a density ρ of < 2.600 g/cm^3.--

--30. The glass according to claim 20, wherein:

said glass is configured as a glass substrate in combination in or with a flat panel liquid-crystal display, such as for a laptop computer, the flat panel liquid-crystal display including a twisted nematic display, a supertwisted nematic display, an

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active matrix liquid-crystal display, a thin film transistor display, and a plasma addressed liquid-crystal display.--

--31. The glass according to claim 30, wherein said flat panel liquid-crystal display comprises:

backlight apparatus;

a first linear polarizer adjacent said backlight apparatus;

a first positive uniaxial retardation film adjacent said first linear polarizer;

a first negative retardation film adjacent said first positive uniaxial retardation film;

a first orientation film adjacent said first negative retardation film;

a liquid-crystal layer adjacent said first orientation film;

a second orientation film adjacent said liquid-crystal layer;

a second negative retardation film adjacent said second orientation film;

a second positive uniaxial retardation film adjacent said second negative retardation film;

a second linear polarizer adjacent said second positive uniaxial retardation film;

said glass substrate comprising a first glass substrate;

said first glass substrate being disposed between said first

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orientation film and said first negative retardation film;

said glass substrate comprising a second glass substrate;

said second substrate being disposed between said second orientation film and said second negative retardation film;

a first electrode being disposed between said first glass substrate and said first orientation film; and

a second electrode being disposed between said second glass substrate and said second orientation film.--

--32. The glass according to claim 20, wherein:

said glass is configured as a glass substrate in combination in or with a thin-film photovoltaic device, including a thin-film solar cell.--

--33. The glass according to claim 32, wherein:

said thin-film photovoltaic device comprises:

said glass substrate;

a transparent conductive oxide film disposed on said glass substrate;

an insulating buffer layer disposed atop said transparent conductive oxide film;

said film being disposed between said glass substrate and said buffer layer and being configured to be a front contact current collector;

a first semiconductor layer disposed upon said buffer layer;

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